Gibson (W.)

A SKETCH OF LITHOTRIPSY, WITH CASES.

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It is now generally admitted that the operation of *lithotrity*, in the hands of prudent and experienced surgeons, possesses decided advantages, *in certain cases*, over that of lithotomy. But it is also admitted that, to perform lithotrity with any prospect of success, requires great dexterity, extraordinary caution, gentleness, perfect familiarity with the use and knowledge of the mechanism of the instruments; and, above all, *instruments* so well constructed and tempered—so diversified in shape, size, number, and adapted to so many different purposes—as to place the operation within the reach of a very limited number of surgeons, however competent in other parts of their profession to excel and even distinguish themselves. Perhaps it will not appear strange, then, when asserted, that no man, now in existence, can be called a *perfect lithotritist*, except Civiale, who, as conceded by all that have witnessed his exploits, is as dexterous and successful with his *litholabe* and other forms of apparatus *peculiar* to himself, as can be imagined. From all this, it may be reasonably inferred, that the cause of failure in so many instances, amongst European and American surgeons, is mainly owing to intrinsic difficulties in the operation itself, to want of experience, to deficiency in mechanical ingenuity and tact, to want of proper instruments and skill in manœuvring them, as well as the idea so prevalent from the very moment of the discovery of *lithotrity* down to the present time, among physicians and others little accustomed to operations of any description, "that *lithotrity* is very easy and simple, and may be performed successfully by those who would not dare to venture on *lithotomy*."

Fortunately, in this state of things, an important discovery has been made within the last few years, that there is no longer absolute necessity for resorting to *lithotrity*, but that the same end may be accomplished by other means, not less efficient, within the reach of a greater number of surgeons, less painful to the patient, attended with little or no risk, (if the surgeon is careful, the case adapted to the operation, and the patient willing to conform to certain regulations,) and, under favourable circumstances, certain of success. I allude to the operation of *lithotripsy*, which may be said, perhaps, to have been invented by Baron Heurteloup.

This operation is founded upon two principles—upon that of *crushing* and of *percussion*—the former chiefly adapted to soft and friable stones, the latter to hard and compact. To accomplish these purposes, several instruments have been invented, and various modifications of the same instrument proposed and executed. It is not my intention, however, to describe or comment upon any except the instrument of *Heurteloup* and that of *Jacobson*, both of which have been used sufficiently long in Europe and America, to enable us to arrive, with some degree of certainty, at conclusions respecting their

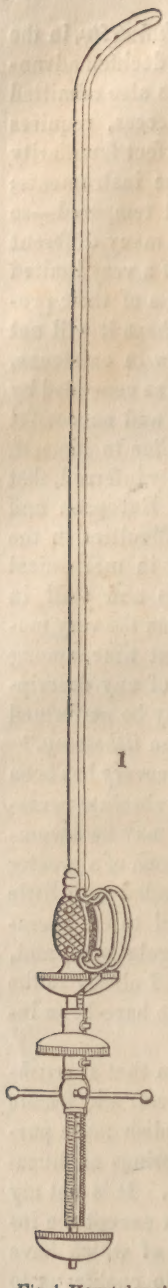

Fig. 1, Heurteloup's *percuteur.*

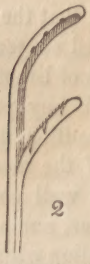

Fig. 2, the termination of the same instrument, the beaks separated.

merits and defects. Heurteloup's "*percuteur*," "*pince à deux branches*," or *lithotripteur*, as it should be called, is extremely simple in construction, remarkable for strength, and consists chiefly of two portions—a male and female steel rod, about twelve inches long, the former enclosed in the latter, and calculated to move backwards and forwards at pleasure, about the size of an ordinary adult catheter, straight for eleven inches of its length, and, at its lower extremity, turned up and gently rounded in form of a beak, at an angle of about 55 degrees. Near the upper extremity of the male rod, there is a graduated scale, intended to indicate the size of the stone, and the summit of the rod is terminated by a steel bowl, designed to receive pressure of the hand in crushing the calculus, or the blow of a hammer. In the latter case, the instrument is held within the grasp of a *vice*, which is applied to a square shoulder on the female rod, corresponding in situation with the graduated scale on the male rod. Above this shoulder, for two inches and a half in extent, is a *male* screw, upon which works a small tripod handle, calculated to drive forward the male rod upon the female, and, by *graduated* pressure, to break the stone. The extremities of the beak are serrated, (but, at the same time, so rounded off and guarded, as to prevent the possibility of pinching the bladder or urethra) and extremely well calculated to seize, retain, and fracture any stone of ordinary dimensions and hardness. The entire length of the instrument, from the summit head to the beak, for a full grown subject, is about 18 inches. For younger subjects and for children, it will vary, proportionally, in length and diameter. (See *Figs.* 1 and 2.)

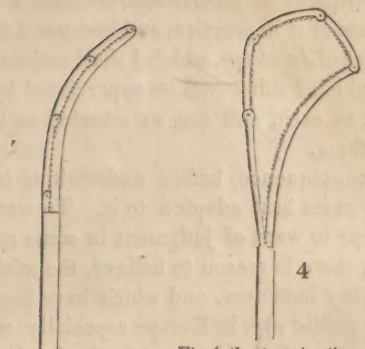

Fig. 4, the termination of the same, with the loop open.

Jacobson's instrument is not designed to act upon the principle of *percussion*, nor is it calculated so to do, but is used, when shut, to detect the presence of a stone, and, when expanded, to close upon and crush it, and would seem, when superficially examined, admirably calculated for the purpose. It consists of a silver cannula, eight or nine inches long, a quarter of an inch in diameter, attached to the superior extremity of which is a circular steel plate or rim, an inch wide. Through the cannula passes a steel rod, which projects beyond its lower extremity, two or three inches, in form of an ordinary sound, flattened and serrated on its concave surface, and smooth and half round on its convex. Connected with this extremity by a hinge, resembling it in form and size, but only an inch in length, is a piece of *chain*, which, in like manner, is attached to a second and a third portion, the last of which is riveted to a straight rod, which, like the former, passes through the cannula, for the length of twelve inches, and is intended to retract or expand the *links*, so as to produce, at will, the form of a common curved catheter or that of a loop. The superior extremity of the straight rod, last mentioned, for three inches in extent, is a male screw, corresponding with a female one, which passes through the centre of a double convex rim, intended to work the chain backwards or forwards, as may be required. (See *Figs.* 3 and 4.)

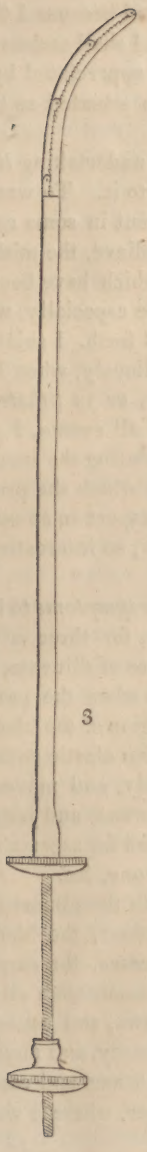

Fig. 3, Jacobson's instrument.

With either of the instruments above described and figured, the operation of *lithotripsy* may be conveniently and successfully performed. In

describing the mode of operating, however, I shall confine myself almost exclusively to the lithotripteur of *Heurteloup*, because I have been more accustomed to the use of it in practice, and because I think it possesses advantages over that of *Jacobson*, which I shall endeavour, afterwards, to point out, and which I think will be appreciated by all who are disposed to give trial to each, and are so situated as to be competent to decide between them.

It is a matter of no little consequence, before undertaking *lithotripsy*, to determine upon the cases best adapted to it. To want of care in this respect, and perhaps to want of judgment in some cases, I may add, may be attributed, there is reason to believe, the mishaps which have occurred in so many instances, and which have been so sedulously concealed from the public eye, in Europe especially, while the successful cases have been as carefully blazoned forth. I shall not be accused, I trust, of making such remarks invidiously, when I assert that the reference is not to individual cases, or to *lithotripsy* alone, but will apply particularly to *lithotrity*. At all events, I shall set the example, if not already done by others, of stating the successful as well as unsuccessful cases, the only mode by which the profession will be able to form a correct judgment with respect to an operation still in its infancy, and, in many points of view, so interesting to science and humanity.

When applied to by a patient, supposed from the *symptoms* to have stone in the bladder, I would advise rest and quiet for three or four days, (especially if just from a journey,) the free use of diluents, and a gentle purgative. After this, and at a moment when the patient has less than his accustomed irritation about the region of the bladder and urethra, a simple steel sound, or a silver, or gum elastic catheter may be introduced very cautiously and deliberately, and moved in various directions for the purpose of detecting the stone, and judging in a measure of its size, situation, texture, shape, and for ascertaining whether it be rough or smooth; whether more than one, &c.

It often happens that the sound is introduced with the utmost facility, and without much inconvenience to the patient, the bladder carefully explored, and no stone felt. In such cases, the surgeon should not rest satisfied, but, discontinuing his examination after a few seconds, should renew it again in a day or two, and sound at one time when the bladder is full, at another when empty, and endeavour to make his instrument, though in the most cautious and careful way, enter into every nook and corner of the bladder, where it would be possible for the stone to lurk.

He should also place his patient, while sounding, in a variety of

positions—sometimes on his side, sometimes on his knees, and, upon other occasions, nearly on his head—never failing, in difficult or obscure cases, to introduce a finger into the rectum, for the purpose of elevating the stone, or of removing it from some cyst or hiding place, and of bringing it in contact with the sound. Very small stones, or fragments, may be touched repeatedly by a person unaccustomed to sounding, without his being sensible that there is a particle of foreign body in the bladder; and even an experienced surgeon will frequently find himself at fault in this respect. From having experienced more or less difficulty in detecting a stone, occasionally, I have, latterly, employed an instrument of peculiar construction for sounding, but not having fairly tested its advantages or brought it to the perfection I anticipated, I shall reserve further notice of it for a future occasion.

If the stone is distinctly felt, is of small size, and has not existed very long; if the patient is an adult, middle aged, or even advanced in years, has, in other respects, a sound constitution, and the bladder and urethra are not remarkably irritable, *lithotripsy* may be always resorted to, and with every prospect of success. But, on the contrary, if the stone is large, hard and rough, has existed for many years, the bladder extremely irritable, contracted, its walls thickened, the kidneys and ureters diseased, the prostate gland enlarged, the stone embedded in a cyst, or fastened upon a fungus; if there has been for months or years a discharge of purulent matter, or of large quantities of slime from the bladder, and the patient is advanced in years or enfeebled in constitution, there will be great risk in attempting *lithotripsy;* and the chance of recovery will be greater, perhaps, from *lithotomy,*—though, from the latter operation, also, patients thus situated, will be extremely apt to die. Both of these are, of course, extreme cases; and between the favourable and unfavourable, there are many intermediate grades, where success must depend, in a great measure, upon the judgment and experience of the surgeon in the treatment of calculous complaints, whether by lithotomy or otherwise. Again, there are cases, as in children, or very young boys, where, from the very small size of the urethra, or the unmanageable disposition of the patients, very little can be expected from *lithotripsy,* or any other operation than lithotomy, which last, in such subjects, fortunately, is almost invariably successful. Upon the whole, it may be stated, that there are many cases, particularly in middle aged and old people, which may admit of a cure by *lithotripsy,* if performed before the stone becomes large and the bladder diseased; and, in this point of view, the operation holds out many advantages; for there are hundreds of patients, who, if they could be

persuaded that their complaint, in its incipiency, admitted of relief by a process comparatively easy and free from danger, would willingly submit to it; but who would shrink from *lithotomy*, until compelled by years of suffering to undergo it, and then, unfortunately, with little chance of success.

Having ascertained the existence of stone in the bladder by accurate sounding, and determined to submit the patient to *lithotripsy*, the next proceeding, on the part of the surgeon, is to prepare him for the operation, by a regular system of diet, by depletion, if necessary, (and there is nothing in the case to contraindicate the measure,) and by the careful introduction of sounds, catheters, occasionally, in order to accustom the urethra and bladder to the use of instruments, to ascertain the exact position of the stone, its usual location, &c. In using such instruments, however, great care must be taken not to irritate the bladder, and to discontinue them the moment the patient complains; and, upon no occasion to *rake* the bladder, which cannot be done, even in the most insensible patient, without great risk of inflammation of that viscus, and even death. *Diet*, too, is of so much importance, previous to attempting the operation, as to be, in my estimation, almost a *sine qua non*, and ought to be strictly enjoined, in some cases, for weeks together, previous to any attempt to seize or break the stone. With most patients, I find a dish of black tea and a bit of dry bread for breakfast, and the same for tea, with boiled rice for dinner, together with a quart of barley water, (to which may be added, if required, a small quantity of cream of tartar to keep the bowels soluble) in 24 hours amply sufficient to support any ordinary adult, and admirably adapted to lesson irritability, keep down inflammation and soothe the urinary passages. By steady perseverance in these measures, almost every patient can be brought into a proper state to undergo the operation with fair prospect of success; but extraordinary vigilance is sometimes necessary to guard against irregularities and deviations, and to prevent a patient from deceiving himself as well as the surgeon. In this country, above all others, where food is so abundant that even beggars live luxuriously, and where the idea is so prevalent, among all classes, that strength is necessarily associated with plentiful supplies to the stomach, it is extremely difficult to persuade patients that they can go wrong in gormandizing. Unfortunately, in too many instances, they find out their mistake too late, and the surgeon discovers, to his great mortification, that he has been deceived and trifled with.*

* There is no establishment so much wanted in this and other large cities as a "*maison de santé*," where patients, especially those from a distance, could be sub-

As an important preliminary to the operation, a firm, thick mattrass and several substantial pillows will be required, the former for preserving the patient in the most easy and comfortable posture, and to prevent him from being overheated, which is so apt to be the case when smothered in feathers, the latter for elevating the pelvis to the requisite altitude, by which movement the stone will have a natural tendency to subside towards the fundus of the bladder, the only position in which it can be seized conveniently. Some surgeons, *Heurteloup*, in particular, recommend an armed chair or kind of sofa, for the patient to lie on during the operation; but, independently of the trouble of carrying such a machine from house to house, more or less alarm is always created in the mind of the patient by such a formidable array in the shape of an apparatus, and as, in reality, there is no necessity for any but the most simple means, such as are within the reach of the surgeon in most families, he should avail himself of them with as little parade as possible. A time having been appointed for the operation, the patient should be enjoined to suffer the urine to collect in his bladder from two to four hours previously, and, upon no account, to permit any of it to escape. But some patients cannot retain their urine beyond an hour, or even so long a time. In that case, a gum elastic or silver catheter may be introduced, and the bladder injected with tepid water, by means of a syringe or gum elastic bag—taking especial care not to employ force or to distend the viscus too suddenly, or to throw in so large a quantity as to give the patient pain, otherwise spasm of the bladder may follow, and a train of other alarming symptoms. If possible, it is best to dispense with the injection, inasmuch as the introduction of the catheter always renders it more difficult to pass any other instrument immediately afterwards. As a general rule, too, I would remark that the best period for the operation is in the morning, before the patient quits his bed; for I have almost invariably observed, particularly in winter, the moment the patient rises and walks about his room, that there is tendency to spasm about the neck of the bladder, and that an instru-

jected to a regular system of dietetic discipline. The boarding-houses, even the best of them, are unfit for invalids, and the respectable ladies who often keep them too poor and too badly compensated to give the necessary attention to the sick. And as to *nurses*, they are often worse than useless, or only prove beneficial by consuming the delicacies, tid bits and potations intended by officious and foolish friends for their sick brethren. When will boarding-house ladies, moreover, divest themselves of the silly and pernicious idea, that by restricting the diet of invalids they will incur the reproach of starving them for mercenary purposes, and thereby hurt the credit of their establishments?

ment cannot then be so readily introduced as it might have been a few moments before.

These preliminaries having been settled, an assistant places one or more pillows beneath the patient's pelvis, another under his head and shoulders, and while the thighs are relaxed and brought nearly together, the body lying parallel with the bed and along its edge, the surgeon standing on either side or in front, having well oiled the lithotripteur, introduces the beak of it (the blades closely approximated) into the urethra, and by one slow but decided movement causes the instrument to glide along the passage, to which its own weight partly contributes, as far as the triangular ligament, which it is known to have reached by the slight resistance met with, and then by depressing the handle gently between the thighs, the point starts suddenly forwards through the prostate gland and enters the bladder. In general, the introduction is effected immediately, but in some cases difficulties are experienced, arising, there is reason to believe, from the difference in the conformation of different patients, from some being more irritable than others, so that spasms are induced, or from rudeness or violence on the part of the operator, or from his being too sudden and rapid in his movements, from an over anxious desire of aiming at feats of dexterity. If any such difficulties should arise, it is better not to persevere by forcible endeavours to overcome them, but to postpone the operation to a future period. Should a stricture, either spasmodic or permanent, exist in the urethra, the surgeon must previously get rid of that before he ventures upon *lithotripsy*. The lithotripteur having been introduced, is not to be carried about roughly from side to side, or fore and aft, for the purpose of raking after and suddenly hunting up the stone, but should be carried very slowly and gently towards the fundus or most dependant part of the bladder, and by the slightest touches with the heel of the instrument, an attempt made in various situations, from right to left, or *vice versa*, to detect the foreign body. During these manœuvres, there should not be the slightest whisper in the room, or complaint, if possible to avoid it, on the part of the patient. An experienced hand and an accurate ear will soon detect the stone, and be able to say by the peculiar sensation communicated through the vibrations of the instrument, whether the stone be rough or smooth, large or small, hard or soft, whether there be more than one stone, &c. However, cases now and then present themselves in which it is not so easy to feel the stone at once and determine its character and position. This may be owing to a variety of circumstances. The patient may be uncommonly irritable, spasm of the bladder may be induced, by which the

urine is forcibly driven from the bladder along the urethra and instrument, or there may be an hour-glass contraction of the bladder, the stone being in one part and the instrument in the other, or the stone may be encysted, or may lurk under the prostate, or there may be naturally uncommon width in the lateral diameter of the bladder, or the rectum may on one or both sides of the bladder, compress it and destroy its shape, or hæmorrhoids or hardened fœces produce a corresponding alteration in its figure. Under these and other trying circumstances, the surgeon should never forget that the longer he gropes about, and the more determined he is not to be foiled, the greater will be his chance of failure. "*Nullum numen abest si sit prudentia,*" should be his motto, and the sooner he acts upon it, by withdrawing his instrument, the better. But suppose, on the contrary, that none of these difficulties have been encountered; that the stone has been readily felt, without giving the patient much pain; that the instrument may be readily manœuvred in the bladder, then the next object in view will be to loosen the blades of the lithotripteur, by turning the tripod or handle of the vice, cautiously opening the claws by pushing back the male rod, and then endeavouring by short, sudden, but gentle lateral movements, with the heel of the instrument, on the floor of the bladder, to pass the gutter of the female rod beneath the stone, the situation of which, with respect to this part of the instrument, may be readily ascertained by depressing occasionally the male rod. It is astonishing with what facility, in some cases, the stone, by a slight lateral movement, may be shuffled into the jaws of the lithotripteur, so much so that the first attempt, sometimes, in the hands of a dexterous surgeon, will suffice for this part of the operation. Having secured the stone within the grasp of the forceps by quickly but gently pushing downwards the male rod, the surgeon next turns the tripod with one hand while he steadies the instrument with the other, and gradually strains upon the stone until he feels or hears it crack beneath the pressure of the serrated claws in which it is embraced. Soft and friable stones give way quickly under moderate pressure, and where no strain is perceived upon the tripod; hard and flinty stones, on the contrary, crack with a sudden jar or snap, and splitting asunder quickly, make a report like the distant smack of a whip, while the tripod is suddenly loosened, but generally resumes its hold upon the remaining portion of the calculus. There are some calculi, however, too hard and solid to be thus broken by graduated pressure; and if the surgeon, not aware of this, and possessing but little mechanical tact or skill, should apply inordinate force to his screw, the beak of the male rod might be broken off, or so sprung

as to prevent it from being disengaged readily from the stone. In such a case, then, instead of straining upon his instrument, in the vain hope of smashing the stone, the proper course to pursue is to loosen the tripod, and by gentle taps with a hammer upon the bowl on the summit of the male rod, to fracture the stone or quarry it. But let it not be supposed that such an exploit can be safely performed while the lithotripteur is merely held in the operator's hand. The percussion, in that case, would necessarily extend to the walls of the bladder, and might be followed by disastrous effects. Fortunately, these are readily guarded against by a *vice* (lined with lead, adapted to the shoulder of the female rod, and held by the surgeon and assistants,) admirably calculated, in every respect, to fulfil the purpose for which it was designed. Having broken the stone, either by graduated pressure or by percussion, the surgeon next closes his instrument and opens it repeatedly, while, at the same time, he moves it quickly from side to side to crush and wash out any small fragments that may project from the edges of the groove, and might wound or lacerate the neck of the bladder and urethra in the act of withdrawing the instrument from that viscus. If he has reason to believe that, by these manœuvres, the fragments have not been gotten rid of, he may generally accomplish his purpose completely by slight strokes of the hammer in the manner already directed. After this, the sooner the lithotripteur is removed from the bladder the better, and the shorter the time the surgeon has taken to perform the operation, the greater will be the chance of success. In general, by the time the operation is completed, there is an urgent desire, on the part of the patient, to let off his urine; but it seldom happens that large fragments come away with the first passage of the urine. In general, only a few small pieces are observed, together with a little sand, and now and then a few drops of blood, produced by the pressure of the shaft or fulcrum of the instrument on the neck of the bladder. It is not desirable, indeed, that the fragments should come away until the soreness of the urethra has passed off, and, fortunately, most patients have the facility of retaining them by laying on their side, and not emptying the bladder completely at each time of evacuating, but always retaining a small portion of urine. In a day or two, however, they begin to present themselves at the neck of the bladder, where they remain a short time, exciting more or less unpleasant feeling, and are then suddenly carried forward and bolted out before the patient is aware of it. In this way, one after another, fragments may pass in rapid succession, and in a few hours the patient has been able to make a large collection of them, the soreness gradually passes away,

and after the lapse of five or six days, is prepared to undergo another operation.

Such, however, is not the invariable result of an operation for lithotripsy, for although the surgeon may have been abundantly successful in breaking up the stone, and may have been extremely rapid and dexterous in his operation, and communicated as little irritation as possible, still the bladder is very prone to resent any offence, even the slightest, that may have been offered to it, and will vent its displeasure on the surrounding and even distant parts. Hence a few hours after the operation, or, in some cases, in a day or two, a chill is induced, followed by fever, profuse perspiration, spasms of the bladder, &c. or these symptoms may have been brought about by the lodgment of a fragment in the urethra. The best course to be pursued, I think, in this state of things, is to bleed the patient as soon as the fever has come on, to administer an opiate injection occasionally, to restrict the diet within the closest bounds, and not to permit the patient to get out of bed—a rule, indeed, which the lithotriptist would do well to observe after each operation, whether any bad symptoms show themselves or not. If a fragment has lodged about the neck of the bladder, and seems disposed neither to retire nor advance, the best plan is to push it back into the bladder by a large catheter or sound; if it has advanced within a few inches or a short distance of the external orifice of the urethra, then it may be got away generally by a bent probe, by a pair of urethra forceps, or, still better, by the curette of Leroy—a most ingenious little instrument, admirably adapted to this and many other purposes.

When the irritation has entirely passed away, which generally happens in four or five days, or, at farthest, a week, the surgeon renews his attempts to seize and destroy the stone, in the manner already described; but, as each operation generally becomes more difficult in proportion as the stone is diminished in size, owing to the greater difficulty of feeling a small foreign body than a large one, it will be proper to detail certain expedients which may be resorted to advantageously in most instances. The course to pursue, then, under such circumstances, is to introduce the lithotripteur, and having reached the fundus of the bladder, to withdraw the male rod for half an inch and upwards, and fish about from side to side, or in various directions, with the groove of the female rod, and, by so doing, the operator will be very likely to collect one or more fragments, the presence of which can be readily ascertained by closing occasionally the jaws of the instrument, crushing the fragments, and then again expanding and making further search, until all the pieces that happen to fall

within the gutter of the lithotripteur are completely broken up or pulverized, and may afterwards be thrown off by the action of the bladder. It is a leading principle indeed, now, with all lithotriptists, to reduce the fragments by successive attempts, to the smallest compass, so as to facilitate their passing off quickly, and with the least possible risk of irritating, or tearing the urethra; and fortunately the bladder, in most instances, seems to understand the surgeon's views, and is abundantly disposed to second them. But, in other cases, old and debilitated patients, especially, there is sometimes so little power in the bladder, that it does not contract sufficiently to expel the foreign bodies which may have been broken up into numerous pieces, and, by accumulating, may still keep up irritation, or in time, by the conglomeration and matting together of particles, lay the foundation of another stone. This was one of the strongest objections, some three or four years since, both to lithotrity and lithotripsy, so much so that it was customary at that period to recommend *lithotomy* in patients thus situated, rather than either of the other operations. By the ingenuity of Heurteloup, however, this difficulty has been in a measure obviated, by means of the "*evacuating sound*," an instrument of peculiar construction, and exceedingly well calculated to collect and bring away, without annoyance to the bladder and urethra, fragments of considerable size, as well as the sand, or debris which accumulates in such quantities in the hollows and certain rendezvous met with in most bladders. But, fortunately, there is another circumstance independently of the advantage to be derived from the instrument referred to, which may serve to console patients in whom the power of the bladder to expel the urine with its accustomed force is diminished or destroyed—that there is reason to believe, in certain cases, that soft and friable stones are susceptible of *solution* in the urine, and are removed in the shape of sand or mud, mixed with slime and other matters. Heurteloup speaks of cases of the kind, and one of this description, I am very sure, has occurred in my own practice.

It will be remembered, I trust, that I do not profess, in this communication, to give more than a sketch or outline of *lithotripsy*, illustrated by a few cases; and if what I have said shall answer the purpose of drawing the attention of the American surgeon to the operation, of clearing up the doubts of some and confirming the sentiments of others, my labour will not be in vain. It has been said, and is even now often reiterated that I have *decried* the operation. This is a great mistake. I have never condemned *lithotripsy;* but have always doubted of the perfect success of "*lithotrity.*" In my text book and

in lectures, I have spoken of the original idea of destroying, by instruments, stone in the bladder, as a most ingenious and beautiful one—have said that the time would come, when such instruments would be so *modified* and *improved*, as to deserve the highest commendation, and that the operation would become an established one, though it would never supersede, in toto, *lithotomy*. Have not my predictions been verified? Have not the most disastrous consequences followed *lithotrity*, even in the hands of *Civiale himself*, the prince of lithotritists, whose magic powers are still unequalled and can never be surpassed in his *particular line*, and in the management of *his own tools?* Is not *lithotrity* now spoken of in Europe, constantly and without reserve, as the "*old method*," *the* "*ancient operation?*" That more or less of the same difficulty, though never, I trust, to the same extent, will attend *lithotripsy*, I have no doubt; that patients will be subjected to the operation who are unfit for it; that mistakes will be committed by the inexperienced and adventurous; that the most wary and prudent operators will be baffled, and foiled, and deceived in their expectations, partly from perverse and obstinate patients, partly from neglect of those about them, and partly from the complicated nature of cases which no human wisdom could foresee, I am prepared to believe and admit. But "Quia non omnes convalescunt idcirco nulla igitur est medicina," is a maxim of sound sense and truth, which should never be lost sight of—which will apply, now and then, to every operation in surgery, and to every medical case, from the most complicated to the most simple.

Before proceeding to detail the cases of lithotripsy in which I have been engaged, and from which most of the foregoing remarks have been derived, I propose to make a few comments upon the instrument of *Jacobson*, and to compare it with that of *Heurteloup;* in so doing, however, I beg leave to declare that it is not my intention to unfurl the banner of opposition on the one hand, or to be led captive on the other, but "to render unto Cæsar the things which are Cæsar's." One advantage, at least, an American possesses over Europeans, amidst their controversies concerning inventions, improvements, discoveries—that he can be impartial. Of Heurteloup, *personally*, I know nothing; of Jacobson, nothing; of French and English lithotriptists and anti-lithotriptists, their politics, parties and squabbles and academical debates, I know and care, if possible, still less. With their *instruments* I am well acquainted, and equally well disposed to give them all the credit, in my poor judgment, they deserve.

Jacobson's instrument is a most ingenious and beautiful one; extremely simple; remarkably strong; not too bulky; of the very best

form for easy introduction; readily withdrawn if any part of it should give way; better adapted, as regards facility, than any other instrument to *catch* and *inclose* a *small* stone, when seized, of great power to break it; and, upon the whole, admirably calculated, *apparently*, for success. But, withal, it is a dangerous weapon; for the natural tendency of the closing of the loop, or zigzag chain, which binds upon the stone, in the act of demolishing it, is to drag the folds about the neck of the bladder and prostate into the embrace of the steel rods, where they emerge from the mouth of the cannula, and to *pinch* them to excess. Nor is this all—the irregular loop, full of small angularities; the numerous joints, and rivets, and dovetails; the prominent knots, and depressions, about each hinge; the inaccuracy and uncertainty, and lateral irregularity of the closing of the different joints; the long line of loop, running from stem to stern along the perpendicular edges which frown from the serrated flat lining the interior of the chain; so well calculated to rake and harrow the plain surface of the bladder; so unadapted to descend into the nooks and hollows; to pass beneath the overhanging bank of the prostate; to enter into a cyst, or between the folds of a contracted bladder—together with the impossibility of enclosing a *large* stone; of the difficulty of picking up fragments after the stone has been quarried and of applying the *principle of percussion* to the instrument, and thereby its inaptitude to *very hard stones;* to say nothing of the difficulty of fixing the stone securely, and of preventing it from shifting from side to side of the instrument, in the act of closing the chain; which want of steadiness, in part, arises from the great length of chain which gives it a serpentine motion when dragged upon, and, in part, from the chain not *hugging* the stone *closely* over its entire surface, but standing off, (particularly if the stone is flat, as most stones are) at every part of the loop corresponding to a point in the chain; and, lastly, the complaint of most patients when the loop is expanded in the bladder, and an attempt made to scoop the stone within the bow of the instrument—a complaint so characteristic, that when I passed it upon one occasion the patient cried out, without knowing the conformation of the instrument, that "I had put a basket into his bladder." These objections are the result of my own observation; I have not hunted up European publications to cull them from; I have seen, indeed, but one publication on this particular subject, and from that I will venture to make an extract, as it seems to confirm the view I have taken:—"La découverte de cette instrument, était precieuse lorsque celui de M. Heurteloup n'existait pas, car on pouvait commencer avec l'instrument à trois branches et continuer avec le brise pierre

de M. Jacobson: mais a présent il est devenu absolument inutile: l' instrument de M. Heurteloup le remplace toujours: et j'ai prouve, dans le chapitre précedént, que le perceuteur peut s'appliquer, avec le moins de dangers, et le plus de facilité possible, dans tous le cas où la lithotritie est practicable; c'est pourquoi il est evident que l' instrument de M. Heurteloup est preferable à tous les autres, et que M. Velpeau a eu tort de choisir l' instrument de Jacobson comme le meilleur. La preuve la plus manifeste de la verité de mes paroles est que cet instrument n'est employe par aucun lithotriptiste connu."*—Not to be unjust, however, to Jacobson's instrument, (whatever my own impressions of it, or those of others, may be) it is but fair to state, that it has been employed successfully in this country in several cases by Dr. Jacob Randolph and others; and the inference, therefore, is plain that it must be an instrument of some merit,—and this I am not disposed to deny, whilst, at the same time, I am inclined strenuously to contend that the *lithotripteur* of Heurteloup is a better one—and, for the following reasons: 1st. That in addition to its working upon the principle of *graduated pressure*, it combines the important power of *concussion;* 2nd. That it does not give the patient so much pain, either during the introduction or whilst manœuvred in the bladder; 3d. That it can grasp a larger stone; 4th. That its beak can descend behind the prostate and enter every corner or pocket of the bladder; 5th. That it is extremely well adapted to seek out and pick up fragments; 6th. That it is so constructed as to render it almost impossible to *pinch* the bladder, were the surgeon even disposed so to do; 7th. That although not so strong, perhaps, as Jacobson's chain, that it would be next to impossible, when well tempered, to break it; 8th. That the only inconvenience I have ever experienced from it, is the liability of the groove, in the female rod, to become clogged with sand and small fragments, so as to give the patient pain in withdrawing the instrument—that this, however, is easily obviated, after a little practice, by opening the forceps, and by slight lateral movements, washing out the fragments, and afterwards crushing the remainder by a few taps of the hammer. One remark, however, may be made in conclusion, and should not be lost sight of, as regards the employment of instruments in general—that almost every surgeon, when once accustomed to a particular instrument, even although that instrument may be an awkward and ungainly one, will perform better with it than another surgeon equally skilled but unaccustomed to it. From numerous sources entitled

* Sur La Lithotripsie et la Taille par M. P. Doubovitzki: Paris, 1835.

to credit, and particularly from my young friend, Dr. E. Peace, (who has just returned from Paris, and has been attending particularly to lithotripsy) I learn that the modifications of Heurteloup's and other instruments are almost endless, and that there is scarcely a lithotritist but has some instrument peculiar to himself. Hence, probably, the great variety of opinions on the subject, and the endless and bitter controversies which have been for some time past, and still are, waging among them. *Time*, the greater instructor in all things, will be able "tantas componere lites." Many of the foregoing remarks will be illustrated by the following cases.

Case I.—Dr. F———, of North Carolina, consulted me on his case in June, 1835, which, in several respects, was a distressing one. He had submitted to lithotomy some months before I saw him; and although the operation had been performed skilfully, the wound never healed, but remained fistulous, and in a little time the stone made its appearance again, and seemed to be enlarging with rapidity. He had been making attempts, I found, to crush it, by means of Jacobson's instrument, but had never succeeded (owing to the severe pain and spasms which followed each trial) in seizing it, or in detatching fragments. I proposed the employment of *Heurteloup's lithotripteur*, and explained to him its mechanism, with which he was so much pleased as to consent to its introduction a day or two after. So extremely sensitive, however, was the bladder, and so great his apprehension, that he would not suffer the instrument to be introduced except in the slowest and most deliberate manner, consuming five or six minutes, frequently stopping its progress with his own hands, and, in fact, almost performing the operation himself. Having at last reached the bladder and felt the stone, I expanded the forceps to an inch and upwards in width, seized the stone and broke off a large piece of it. All this was effected so quickly, according to his ideas of time, as greatly to delight him, and determined him to submit to further efforts to obtain relief. Accordingly, a few days afterwards, another trial took place; and although the operation was performed partly by me and partly by himself, it proved equally successful as the first attempt, and encouraged him to proceed with other trials, at one of which Dr. Hays and other gentlemen were present. After each operation, however, there was always more or less chill and fever; and as the patient's constitution had been greatly impaired by long suffering previous to my having seen him, I was almost afraid, after each trial, to touch him again. In proportion, however, as the fragments were gotten away (though sometimes by sticking in the urethra they gave him great uneasiness,) his constitution continued

to improve so rapidly as to enable us to renew attempts with greater frequency, but always with more or less success. Towards the end of July, however, I was obliged to leave town, and to take my instruments with me, which put a stop to further proceedings for several weeks. During my absence, the patient had procured an imitation of Heurtèloup's lithotripteur, and assisted by some of his friends, particularly by Dr. Rose, had succeeded in removing other fragments. From that period, during the whole of the last winter, he was engaged in operating on himself, with occasional assistance from myself and Dr. Rose, and was enabled, by great industry and perseverance, to make in the spring a collection of fragments and sand amounting to 3 ʒ 12 grs. in weight. By this time his health was so much improved as to enable him to return to Carolina. Such is the tendency, however, in his particular case, to generate calculous matter, that it is very questionable whether he will not be liable, always, to its formation, unless by change of diet, water, and climate, he can effect such a change in his constitution as to get rid of the diathesis—a result earnestly wished for by his numerous friends, who sincerely sympathize with him in his great distress and sufferings.

Case II.—At the request of Dr. Tyndale, a most intelligent and respectable practitioner, whom I had the pleasure of meeting during a visit of a few days at the White Sulphur Springs, in Virginia, in the summer of 1835, I saw, in consultation with him, W. T., Esq., of Pittsylvania. Believing, from the symptoms, that the patient had stone in the bladder, I was induced to sound him, and discovered a calculus of considerable size, under which he had laboured, in all probability, for several years. From this and other causes, his health had been long impaired and his constitution irritable. In some respects, however, his case appeared to be adapted to *lithotripsy*, but totally unfit for *lithotomy*. Having my instruments with me, and wishing to ascertain whether the stone was hard or soft, I prevailed on Mr. T. to submit to the introduction of the lithotripteur of Heurteloup; and although the bladder had not been fully distended with water, or the patient prepared by diet for the operation, I succeeded in detaching small portions of the stone, which were brought away in the gutter of the instrument, and which proved to be soft and mortar-like, but full of sharp, needle-like points. A slight chill and fever followed this attempt; from which, however, after a few days, no inconvenience resulted. I then took leave of the patient, and advised him to repair to Philadelphia the ensuing autumn and undergo the operation of *lithotripsy*, enjoining upon him at the same time the necessity of regular preparation, by appropriate diet, for several weeks

previous to leaving home. Shortly after my departure from the Springs, Mr. T., from eating boiled corn and other unwholesome articles of food, had a violent attack of cholera morbus, and with great difficulty recovered from it. From that period his constitution became enfeebled, and he suffered more than ever from the disease in his bladder, passing occasionally lumps of sabulous matter, like mortar in consistence, but full of so many sharp crystallized points as to create great pain and soreness in passing them. During the whole winter he remained at home, unable to set out for Philadelphia; but towards the spring, finding his health somewhat improved, made the attempt, and arrived, after encountering bad roads and very unfavourable weather, on the 27th of April, 1836, exhibiting great marks of fatigue and long suffering, and very much changed in appearance since the period I had first seen him. Finding that Mr. T. had been making no preparation in the way of regimen to facilitate the operation of *lithotripsy*, and to guard against irritation and inflammation, I placed him at once in lodgings, as near to my own residence as possible, in order that I might watch him closely and be with him at a moment's warning in case of difficulty, impressing at the same time upon his landlord the necessity of the strictest attention to diet, &c. Having consumed nearly a month in subjecting him to dietetic discipline, and dilating the urethra by gum elastic catheters, I commenced regularly, May 24th, assisted by Dr. Mutter, with the operation of *lithotripsy*, introduced Heurteloup's instrument, touched the stone, but could not seize it, owing to the small quantity of urine contained in the bladder, but which, notwithstanding, the patient informed me, had been collecting for several hours. From this operation no inconvenience followed, and the patient was ready on the 26th for another trial. At this operation also Dr. M. assisted. The *lithotripteur* being introduced, the stone could not be felt, owing to the small quantity of urine contained in the bladder. To obviate this difficulty I withdrew the instrument, injected the bladder with tepid water, again introduced the *lithotripteur*, seized a portion of the stone, which readily crumbled beneath the pressure exerted upon it, and brought away small mortar-like fragments. Other pieces of similar appearance were discharged along with the urine in the course of the day. To facilitate the seizure of the stone upon this occasion, I found it necessary to introduce a finger into the rectum, and raise the stone from the fundus of the bladder, or the bed, or cyst, into which it had been accustomed, as I had reason to believe, to lurk. Four hours after the operation the patient complained of having a slight chill; this continued for an hour, and was followed by a little fever. These symptoms I thought might

be attributed in part to the weather being uncommonly cold, raw and damp, from the continued prevalence for some time of easterly winds. Towards night the constitutional symptoms passed away, and the only complaint the patient made was of unusual soreness along the urethra, which I accounted for by the passage of the mortar-like substance, armed with its crystallized points.

Upon visiting the patient next day, (27th,) I found him complaining of desire to evacuate urine every twenty minutes, and of a discharge of ropy mucus of yellowish tint. These symptoms continued throughout the day, more or less, and were unabated on the next day (28th,) which induced me to order the hip bath and 30 drops of black drop, and a weak opiate injection per anum. Under the influence of these, Mr. T. slept soundly until 3 o'clock, P. M. During the afternoon, however, more or less of drowsiness continued, and the desire to make water had nearly ceased, and so remained throughout the night, but, in the morning (29th,) returned with its former urgency. To combat this as soon as possible, the opium was again resorted to, both in form of injection and black drop, internally. In the afternoon, also, an aloetic pill was administered, and a blister applied to the sacrum. Under the influence of these the patient passed a good night, almost undisturbed by spasms. On the next morning, (30th,) the desire to pass urine, accompanied by spasms, returned and continued all day, at intervals of fifteen or twenty minutes. At five o'clock, P. M., a suppository, consisting of three grains of cicuta, and two of opium, was administered. At eight o'clock, P. M., the pulse, for the first time, became full and bounding, owing to two much nourishment (consisting chiefly of raw oysters) having been taken, and to the room being filled with the gas of anthracite coal, which is as deleterious in its operation as that of charcoal. To remove these symptoms, the patient was bled to ten ounces. Notwithstanding the bleeding, the patient passed a restless night, and on the next morning (31st) the spasms returned with more violence than ever. In the course of the forenoon, a laxative enema was administered two or three times, and produced copious evacuations. At 3 o'clock, P. M., it became necessary, on account of frequency of alvine discharges, to administer an opiate enema. This checked the diarrhœa and spasms for the night, but in the morning (June 1st) the spasms returned again, and continued with more or less violence throughout the day. Various remedies, besides the opiates and other means detailed, were tried ineffectually, and, although the symptoms varied from time to time, the spasms and pain in passing urine were the prominent ones, and came on at last with such violence, and at such short intervals, as to

prostrate the patient beyond the possibility of recovery. Two days afterwards (June 3d) he died. Permission could not be obtained to examine the bladder and its relations, a circumstance much to be regretted, especially as lithotripsy is still in its infancy and requires all the light that can be shed upon it. But, although denied the opportunity of examining the condition of the bladder, and of ascertaining *positively* the cause of death, there are several circumstances connected with the case exceedingly well calculated to unravel a part of the mystery. From the history of it I have detailed, it will be seen that extraordinary pains were taken to prepare the patient for the operation, by restricting his diet in every possible way—by confining him to his room, and by the use of instruments calculated to enlarge the urethra and accustom it afterwards to those to be employed for the destruction of the stone. Unfortunately, however, the interesting sufferer was not aware of his own danger, and with the best possible intentions, in deceiving me in what he supposed to be little matters of no moment, he deceived himself, and led to results which I am very confident would not otherwise have followed. Instead, then, of attending *strictly* to the regimen I had prescribed, (as I have since ascertained from the best authority,) instead of living entirely on barley water, black tea, dry bread, and rice, and avoiding altogether animal food during the entire month of preparation preceding the operation, his meals were taken with the family with which he lived, and every article on the table he happened to fancy freely indulged in. This course, together with undue exercise, either in his room or abroad in the streets, was calculated, as I am sure every experienced surgeon will admit, to produce the worst effects, especially in a patient advanced in years, of irritable constitution—one who had long suffered from violent attacks of other diseases—whose bladder had been thickened and contracted by the lodgment, for years, of a large stone—whose kidneys, in all probability, were also diseased, besides other organs, more or less important in the animal economy. I trust it will not be supposed that I mention these facts by way of exculpation or for the purpose of casting a veil over any errors I may have committed. Those who know me, I think, will acquit me of such intentions. Nor would I have it supposed that I am casting unjust and unnecessary censure upon the respectable patient for whom I felt the highest personal regard and respect, and in whose case I took the most sincere and lively interest. My only motive in detailing such circumstances, is the public good, and for the benefit of those who may be now engaged in treating similar cases, or who may do so hereafter; for there is nothing more likely, than that patients similarly situated

with Mr. T., (who, from having always been accustomed to plentiful and luxurious living—to all the comforts and delicacies of life,) will not voluntarily refrain from such enjoyments, especially if they can persuade themselves that the indulgence in them cannot interfere, materially, with their complaints and the mode of treating them.

Case III. At the request of my friend, Dr. Joseph G. Nancrede, I saw, in consultation with him, in April, last, Mr. Charles O'H., 63 years of age, who, for the last few years, had led a sedentary life, and complained, latterly, of symptoms of stone in the bladder. Upon sounding the patient, a stone of large size was distinctly felt, both by Dr. Nancrede and myself, and the case pronounced, in every respect, suitable for *lithotripsy.* The patient having consented to the operation, was accordingly prepared for it, by being placed on a diet of rice, barley water, and black tea; very little time, however, was required for this purpose, inasmuch as he had abstained for some time previously, from animal food, by advice of Dr. Nancrede.

On the 1st of May, 1836, I commenced the operation in presence of Dr. Nancrede and Dr. J. Y. Hollingsworth of Maryland, by introducing a large silver catheter, and injecting the bladder with tepid water, until the patient complained of uneasiness from a sense of distension. The catheter was then withdrawn, and the *lithotripteur* of *Heurteloup* introduced, but the stone not felt until the patient turned a little on his side; I then perceived it to roll over the instrument heavily, which convinced me, at once, that it was large. Upon placing the patient on his back, and elevating his hips with pillows, the heel of the lithotripteur came in contact with the stone, which was readily seized, (though not until I had expanded the blades of the instrument beyond an inch and a quarter,) and, by a few turns of the tripod, broken it into several large fragments, the cracking of which, as they were rent asunder, could be distinctly heard. During these manœuvres the patient remained perfectly still, experienced not the slightest uneasiness, (except that arising from over distension of the bladder,) and was conversing, cheerfully, during the whole operation, which did not exceed in duration five minutes. Upon withdrawing the *lithotripteur*, and directing the patient to stand up and evacuate his urine, numerous small fragments were discharged, besides those contained in the blades of the instrument. The catheter being again introduced, and the bladder injected, other fragments were brought away. Neither pain, chill, nor fever followed the operation; the fragments, in small quantity, continued to pass away, but not with as much rapidity as if the muscular power of the bladder had been greater.

On the 16th of May, I repeated the operation, in presence of Drs. Nancrede, Horner, and Mutter, seized, without difficulty, fragment after fragment, and fractured them, without giving the patient any pain whatever, except upon withdrawing the instrument, which, from being a little clogged with pieces of the stone, produced slight irritation at the external orifice of the urethra. No constitutional disturbance followed, and the patient, as heretofore, passed again small fragments.

May 19th, in presence of Drs. Nancrede, Hays, Mutter, Caldwell, and Bush, of Kentucky—Cabell, of Virginia, and several medical students, I renewed my attempts upon the fragments of Mr. O'H.'s stone, with the success I had hitherto met, and without the operation having been followed by a single unpleasant symptom. Fewer fragments, however, than usual, passed away, immediately after the operation, and for several succeeding days, owing to continued inactivity of the bladder, or want of muscular power.

24th, in presence of Dr. William Crump, a distinguished physician of Powhattan County, Virginia, Drs. Mutter, M'Crea, Stewardson, Pennebaker, Smith, Mr. W. Tunstall, of Virginia, and many medical students, I performed upon Mr. O'H. the operation he had, upon former occasions, undergone. Previous to commencing it, however, it was necessary to remove a fragment from the urethra, which lodged about an inch behind the glans and was easily removed by a bent probe. Several of the fragments in the bladder, notwithstanding the former operations, measured, by the graduated scale, half an inch, and even three quarters. These were distinctly heard to crack by several of the gentlemen present, under the pressure of the tripod. This, like the former operations, was followed by no unpleasant occurrence.

29th. (Drs. Nancrede, W. P. Johnson, and J. Wallace being present,) I performed lithotripsy for the fifth time on Mr. O'H., and without injecting the bladder, seized upon fragment after fragment, and instantly reduced them to pieces so small, that scarcely a particle could be caught larger than a quarter of an inch, though in the commencement of the operation, two or three fragments, exceeding half an inch in size, were met with. As usual, the patient bore the operation without a murmur. Several fragments and a good deal of debris came off in the blades of the forceps. But several days elapsed, after this operation, before any pieces of consequence were discharged with the urine. Early in the morning, however, on the 1st of June, I was sent for to remove a fragment that blocked up the urethra near the neck of the bladder, which I thought best to push back with a catheter.

June 12th. Accompanied by Drs. E. Peace and W. P. Johnston,

I again visited Mr. O'H., introduced a large silver catheter and drew off a small portion of urine, which the patient could not expel by his own efforts, injected the bladder with tepid water, and introduced the lithotripteur of Heurteloup, with a view of crushing any fragments that might remain, but, much to my surprise, found that none could be detected; not satisfied, however, with this examination, I determined to explore the bladder with the common sound; but still with the same result. This was accounted for by examination of the bottle containing the discharged pieces, which had accumulated since the last operation, (May 29th,) so considerably, as to add, largely, to the portions previously expelled, and which taken, collectively, from first to last would have been sufficient to form a stone of the size of a walnut, and one much larger might have been formed, if the patient had taken pains to collect all the pieces—but owing to inaccuracy in this respect, a great deal of sand and numerous fragments, there is reason to believe, must have been lost. As usual, no inconvenience resulted from this examination; but, four days afterwards, (June 16th,) I was sent for, early in the morning, to visit the patient, who felt alarmed at the idea of a fragment being lodged in the urethra; such, however, upon passing the instrument, I could not discover, and, therefore, concluded that irritation had been created by the patient having changed his diet too suddenly, after having been told that he was nearly rid of his calculus. Upon this occasion, indeed, I found him over a large bowl of coffee, and surrounded by piles of bread and butter. By directing him to resume his tea and barley water, all uneasiness about the bladder and urethra disappeared in a few hours. On the 20th of June, I paid him another visit, and found him complaining of slight tenderness in one testicle and a prickling sensation in the urethra. Suspecting the lodgment of a fragment, I introduced a pair of small forceps, and extracted a piece about a quarter of an inch in length.

In the presence of my friend, Dr. Norcom, an eminent physician of North Carolina, Dr. Chase, Dr. Nancrede, and Mr. Schively, I repeated the operation to-day, (June 29,) on C. O'H., by injecting the bladder, introducing the lithotripteur, and searching for the stone; but, after moving the instrument in every direction, within the bladder, I could not touch a fragment. The lithotripteur was withdrawn, and the patient rose and passed his urine. It then occurred to me, that by sounding the patient with the bladder *empty*, I might be able to feel the stone and crush it. Upon so doing, accordingly, a fragment about half an inch thick, was distinctly felt, and almost immediately seized and demolished. Another was also caught, and as readily destroyed. In the groove of the instrument, as usual, portions of mortar-like matter

were found. Fully convinced from the accurate examinations made at different periods that the fragment destroyed to-day was the only one the bladder contained, I feel very confident that the patient will be entirely rid of his complaint, as soon as the pieces come away, which will probably take place in a few days.

Case IV. H. M., of Virginia, 34 years of age, arrived in Philadelphia on the 29th of April, 1836, and consulted me on his case, which, in some points of view, was a singular one. According to the patient's statement, a persimmon seed had been introduced into his urethra, and found its way into the bladder, where, in all probability, it had served as a nucleus for a stone; for, in a short time after, symptoms resembling those of stone, were manifested. Upon sounding the patient, I discovered a calculus of small size, and (judging from the feel communicated to the sound) of soft consistence. Anxious to undergo *lithotripsy*, or lithotomy if I preferred it, he was placed, at once, upon appropriate diet, directed to drink plentifully of diluents, and while pursuing this course, had the urethra dilated with bougies, catheters, &c. After persevering in this system for three weeks, the patient became exceedingly desirous of submitting to the operation itself, and, as he possessed considerable mechanical skill and ingenuity, and had examined with great curiosity the instruments for lithotripsy, expressed a decided preference for that of *Jacobson*. To gratify him, therefore, it was employed, and, with the utmost caution and gentleness, attempts made to seize the stone; but, so great was the irritation, and so severe the spasmodic action of the bladder, induced by its presence, that it appeared to me it would have been forcibly expelled from that viscus. I was obliged, therefore, to withdraw the instrument, after the lapse of a few seconds. This attempt was followed by severe chill and fever, which confined the patient for several days.

On the 26th of May, assisted by Dr. Mutter, I commenced, regularly, with Mr. M., and, at his request, again employed the instrument of *Jacobson*, notwithstanding the suffering it had previously occasioned him. Accordingly, it was introduced, but created so much pain and inconvenience that he peremptorily demanded its removal. Upon withdrawing the instrument, the urine which had been retained three or four hours, escaped, and rendered it necessary, before proceeding further, to inject the bladder with tepid water. After this, the *lithotripteur of Heurteloup* was introduced, and the stone almost immediately seized and crushed under the pressure of the tripod or screw—creating a sound similar to that of chalk, when broken between the fingers. In the groove of the instrument,

numerous small fragments were found, and, in course of the day, several large pieces discharged along with the urine, some of which were encrusted with a dark brown or black skin, similar to the husk of a persimmon. The stone, as I had predicted, was of rather soft consistence, and apparently composed of the ammoniaco-magnesian phosphate. Before the completion of the operation, the patient suffered a good deal from pain and spasm of the bladder, but these soon ceased, and were not followed, as in the former attempts, by chill and fever. Two days (May 28th) after the operation, however, the patient complained of great pain in the urethra, but was suddenly relieved by the discharge of a large fragment, in the centre of which was a hollow or depression, corresponding in shape and size with a persimmon seed.

On the 29th, another fragment was discharged, but, as no other made its appearance from that period until the 6th of June, I introduced, on that day, in the presence of Mr. Saltmarsh, the instrument of *Heurteloup*, and used it as a sound, but could not detect any portion of stone. However, the next day, (June 7th,) a fragment, half an inch long, and hollowed out in the centre, passed off with the urine. At the same time, a portion of black skin resembling the rind of a persimmon was thrown off. On the 9th of June, the lithotripteur was introduced, but without detecting a fragment. The same operation was repeated four days after (June 13th) in presence of Drs. Johnson and Peace, but with no better success. Having experienced no inconvenience from the two last examinations, another was made (June 17th) in presence of Mr. Saltmarsh, and a fragment about the size of a bean felt at the fundus of the bladder, which was readily caught and crushed. In the course of the day, three oblong fragments, a quarter of an inch thick, passed away with the urine. With the view of ascertaining whether other fragments still remained in the bladder, the *lithotripteur* was again introduced, (June 20th, Mr. Saltmarsh being present,) but nothing could be felt. Soon after this examination, the patient changed a pair of cloth pantaloons for thin ones, and walked about the streets for some time, and, when he returned to his lodgings, was seized with chill, followed by high fever, which rendered it necessary to bleed him and restrict his diet more than ever. Since that period he has been confined to his room with sore throat, cold, and more or less fever, which, for the present, prevent the operations from being continued. That any fragment of stone remains in the bladder, seems to me extremely doubtful; it is more than probable, however, that the *persimmon seed* is still there, inasmuch as no portion of the *substance* of the seed has been yet dis-

covered, and, as he complains, after passing urine, of something presenting itself at the neck of the bladder. Whether the *lithotripteur* will be able to destroy the texture of such a substance, (which closely resembles softened horn,) I am at a loss to say. In truth, until I saw the pieces of black skin discharged along with the fragments, I did not believe that such a foreign body had found its way to the bladder, and had placed the patient's account of the mode of its getting there to the effect of imagination.

On the 28th of June, the patient having recovered, in a great measure, from the effect of his cold, another examination was made with the *lithotripteur*, but smaller in the shaft and shorter in the beak than the one commonly employed. This did not enter with facility, but met with considerable obstruction at the neck of the bladder; it finally started forward, very suddenly, and was completely introduced. Some hours after, the patient discharged, along with the urine, more or less venous blood, the result, no doubt, of the pressure of the short beaked instrument upon the prostate and neck of the bladder. To-day (June 29th) the urine is colourless and the patient free from soreness in the urethra, and, as the weather is becoming warm and oppressive, and he complains of being weakened and reduced, I have advised him to postpone further operations for the present, and retire for a few weeks to the country.

Case V.—P. P., Esq., about 48 years of age, of literary and sedentary habits, troubled more or less with dyspepsia, came to Philadelphia last fall, by advice of my friend, Dr. Thomas, a distinguished physician of Westchester, to consult me about symptoms resembling those of stone in the bladder. His engagements, however, at that period, were such as to prevent him from being sounded, and from remaining in town. About the middle of May, 1836, he returned to Philadelphia, and upon sounding him I discovered a small stone, and concluded, from its ringing distinctly when struck by the sound, that it was a hard one. Believing the case adapted to *lithotripsy*, I advised the operation, placed him in suitable lodgings, and commenced a *system of diet*, which, indeed, he himself had been observing, in a measure, for some time before, having anticipated the necessity of such a course. After using, also, gum elastic and other instruments to familiarize the urethra with such guests, I commenced the regular operation (May 21,) by introducing *Jacobson's* instrument, which, however, gave excessive pain, brought away blood, created severe chill and fever, and rendered the patient so ill as to induce me to advise him to return to the country after the symptoms had abated, and remain until he recovered sufficiently to undergo a trial with

another instrument. Accordingly, he left town on the 26th of May, and returned on the 4th of June, improved in appearance and health.

On the 8th of June, assisted by Dr. Mutter, I introduced the *lithotripteur* of Heurteloup; and after searching for the stone a few seconds, discovered, seized, and fractured it, as it lay in the fundus of the bladder on its right side. During the turning of the screw, the fragments could be heard cracking distinctly, the report being very sharp and sudden, like that of a whip. Upon removing the instrument, numerous small fragments were found in its claw and gutter, of a yellowish or gamboge tint, intermixed with harder portions of dark brown fragments; which, from appearance, I should suppose were made up of oxalate of lime and lithic acid. During the operation the patient scarcely complained of pain, and remarked that the uneasiness arose more from sense of distension, from having retained his urine two or three hours previous to the operation, than from the instrument. Neither chill nor fever followed this operation; and the next day sand and several small fragments were discharged with the urine.

On the 14*th of June*, the patient felt well enough for another trial, which was accordingly made, and with the same happy result—the stone having been seized instantly and crushed with an audible noise. Numerous fragments came away in the groove of the *lithotripteur*, and the next day three larger than a pea were discharged along with the urine—the whole collection, from the two operations, being sufficient, if put together, to form a stone the size of an almond. During the operation, the patient did not complain of pain or spasm of the bladder; more or less of which last he had usually experienced while the instruments remained in that organ.

On the 17th, I visited Mr. P. again, (accompanied by Drs. Peace, Chase and Johnston) with the view of searching for fragments; but the patient not having allowed the urine to collect in sufficient quantities to seize them with safety, I declined the operation, but merely used the *lithotripteur* as a sound, to determine the size and situation of the pieces.

On the 22nd of June, in presence of Mr. Saltmarsh, I made another examination, but without being able to detect a fragment, and repeated the effort on the 25th and 29th, but with no better success. That there is still a fragment in the bladder, however, is rendered probable by the circumstance of the patient feeling an obstruction, occasionally, about the neck of the bladder after walking or remaining for some time in the erect position, an obstruction sufficient to impede the flow of urine for a moment, or until removed by a change of position. But the patient's engagements are such as to prevent him from staying

longer in town at present; and as he is desirous of recovering, also, from the effects of his restricted system of living, he returns to his farm, and, after harvest, intends to have the bladder still further explored.

In examining the details of the above cases, it will be seen that I do not report them as perfect *cures*, although they are, I think, in a fair way to become so. They are of too recent occurrence, moreover, (so far as the operation is concerned) to expect that I should have been able to pronounce *decisively* as to the result. But I prefer, at any rate, giving an account of them at this time, because it will be expected that I should notice them hereafter, and state, for the benefit of the profession, whether they have been cured or not, or whether there has been a return of the complaint. It has been objected, indeed, to the operation of *lithotripsy* in Europe, that many of the patients, *reported* as cured, have not in reality been so; that in several instances death has followed a few months afterwards, from long continued irritation of the bladder and urethra, or from other disease; and that when such has been the result, the operators have not deemed it incumbent upon them to disabuse the public on the subject. For my own part, I can with confidence, declare that truth, and nothing but truth, is the object of my inquiries, and of the practice in which I am now engaged; that if I find, after full trial and ample experience, *lithotripsy* unworthy of the commendation which has been bestowed upon it, I shall renounce it; that, on the contrary, if it turns out, as I ardently hope it will, to possess, in many instances, advantages over *lithotomy*, I shall advocate and support it. In conclusion I may state, that I have not introduced into this paper an account of several cases in which I have been consulted, because they were either unfit for the operation, and, therefore, abandoned, rather than risk the patient's life in the attempt, or because the patients themselves were unwilling that the trials should be continued, rendering it thereby impossible for any just inference to be drawn from them, either in favour of, or against lithotripsy.